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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
08/723,483	09/27/96	AVERKIOU	M ATL-139

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EXAMINER

FIELDS, D

ART UNIT

PAPER NUMBER

3305

DATE MAILED:

09/10/97

*Remitted*  
*1/15/98*

This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

OFFICE ACTION SUMMARY

☒ Responsive to communication(s) filed on 9/27/96

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

- ☒ Claim(s) 1-36 is/are pending in the application.  
Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
☐ Claim(s) \_\_\_\_\_ is/are allowed.  
☒ Claim(s) 1-36 is/are rejected.  
☐ Claim(s) \_\_\_\_\_ is/are objected to.  
☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

Application Papers

- ☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.  
☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.  
☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.  
☐ The specification is objected to by the Examiner.  
☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).  
☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.  
☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_  
☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of Reference Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2, 4

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--SEE OFFICE ACTION ON THE FOLLOWING PAGES--

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## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. Claim 8 recites the limitation "the decimation rate" in line 4. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 1-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Johnson et al.  
'257. Regarding claims 1 and 30-36, Johnson et al. disclose an ultrasonic transducer probe for transmitting ultrasonic pulses into a body infused with an ultrasonic contrast agent and receiving ultrasonic echo signals following a pulse transmission comprising an ultrasonic probe including an array 12 of ultrasonic transducers which transmit and receive ultrasonic energy (see col. 2,

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lines 56-58), a beamformer for forming coherent echo signals comprising an ultrasonic beamformer **16** which during transmission controls the timing of actuation of the of the separate elements of the array **12** and activates the transducer pulses of a transmitter/receiver **14** at appropriate times to pulse the transducer element so that a steered and focused ultrasonic beam is produced (see col. 2, lines 58-63), means for differentiating coherent echo signals received from two pulse transmissions comprising a pulse to pulse differentiation subsystem **24** (see col. 3, line 10), means for detecting differentiated coherent echo signals comprising the demodulated signal components amplitude detected by an envelope detector **20** (see col. 3, lines 5-6), and a display for displaying detected differentiated signals emanating from said ultrasonic contrast agent comprising display **50**.

Regarding claims 2 and 31, Johnson et al. disclose an amplitude detector comprising amplitude detected by an envelope detector **20** (see col. 3, line 6).

Regarding claim 3, Johnson et al. disclose an event discriminator for discriminating detected signals which are emanated from a contrast agent comprising a pulse to pulse differentiation subsystem **24** (see col. 3, line 10).

Regarding claim 4, Johnson et al. disclose means for comparing detected signals against a threshold level comprising the results of the subtraction process are compared against a threshold level supplied by a threshold circuit **26** (see col. 3, lines 31-32).

Regarding claim 5, Johnson et al. disclose a B-mode processor for producing B-mode image signals wherein said display displays a B-mode image combined with the display of detected

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differentiated signals emanating from said ultrasonic contrast agent comprising B-mode imaging if desired and the resulting image displayed on a display **50** (see col. 4, lines 4-14).

Regarding claims 6-12, Johnson et al. disclose a programmable filter comprising filter **22** (see col. 3, line 7).

Regarding claims 13-18, Johnson et al. disclose the destruction of said microbubbles by a time interval comprising a beamformer for controlling the timing of pulse transmission by said transducer array and the timing of delays applied to said electrical echo signals (see claims 17 and 18).

Regarding claims 19-23 and 26-29, Johnson et al. disclose transmitting a first pulse into the body which is focused at a depth within the body to cause a response from microbubbles located at a first depth comprising the first pulse causing the coated microbubbles in the path of the ultrasonic beams to rupture, receiving echoes following the transmission of said first pulse comprising sending acoustic waves back to the transducer array where the waves are received and processed by the system (see col. 3, lines 16-19), transmitting a second pulse into the body which is focused at a second depth within the body to cause a response from microbubbles located at said second depth, receiving echoes following the transmission of said second pulse comprising a second pulse (see col. 3, lines 19-25 and line 11-41). It is inherent to have echo signals transmitted at different pulses that can be differentiated by the pulse to pulse differentiated subsystem **24**.

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Regarding claim 24, Johnson et al. disclose processing said receive echoes for display by displaying greater intensity echoes with a lesser brightness or color intensity than echoes of lesser intensity comprising the occurrence of a significant number of events in a period of time is indicated by highlighting the corresponding region of an image of the body with image brightness or color (see col. 3, lines 45-48).

Regarding claim 25, Johnson et al. disclose transmitting an ultrasonic wave which is destructive of microbubbles, said wave exhibiting a range of frequencies including a frequency which is destructive of microbubbles of a given size comprising images that can be overlaid with color which spatially depicts the frequency of microbubble events in the imaged areas (see col. 3, lines 55-59).

Regarding the trigger circuit and contrast signal detector that the applicant discloses in claims 6, 30, and 33, the examiner interprets these limitations to be the T/R **14** and envelope detector **20** taught by Johnson et al. which performs the same functions.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derrick Fields whose telephone number is (703) 305-6933. The examiner can normally be reached on Monday - Friday from 7:00a.m. to 4:00p.m.

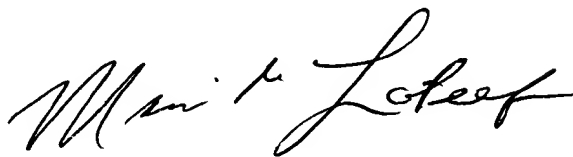
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marvin Lateef, can be reached at (703) 308-3256. The fax phone number for this Art Unit is (703) 308-0131.

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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0858.

A handwritten signature in cursive script, reading "Marvin M. Lateef".

MARVIN M. LATEEF  
SUPERVISORY PATENT EXAMINER  
GROUP 3300

df

March 25, 1997